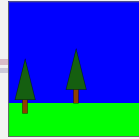
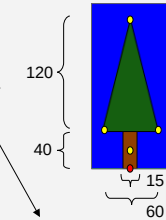


Example

Consider the two trees in the scene.



- Do we need a drawing function?
→ yes, each tree has two shapes and there's more than one tree
- What is being drawn?
→ a tree
- What differs from one copy to the next?
→ position (both x and y)
- How is it drawn?
→ dark green triangle, brown rectangle
→ let "position" be the center of the bottom of the trunk (red dot)
- What are the specific values for the "what differs" things?
→ tree on the left: x: 50, y: height-70
→ tree in the middle: x: width/2, y: height-100



position (red dot) – (x,y)
rect center – (x,y-20)
triangle – (x-30,y-40),
(x,y-160), (x+30,y-40)

Function Syntax

- function definition
→ must go outside any other function definitions
- ```
// comment describing the function's purpose and its
// parameters

void funcName (type paramName1, type paramName2, ...) {
 function body
}
```
- parameters → function header
- function call  
→ must go within the body of a function definition
- ```
funcName(value1,value2,...);
```
- arguments

Plugging in the Elements

For the drawing function definition –

- What is being drawn? → **function name** (and comment)
- What differs from one copy to the next? → **parameters**
- How is it drawn? → **function body**

For each parameter –

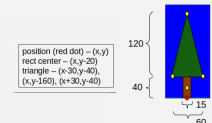
- What is it for? → **parameter name** (and comment)
- What kind of value is it? → **parameter type**
 - whole number – int
 - number with decimal point – float
 - true or false – boolean

For the function call(s) –

- What are the specific values for the "what differs" things?
→ **arguments for the function call(s)**

Syntax Example

- function definition
- ```
// draw a tree
// (x,y) is the center of the bottom of the trunk
void drawTree (int x, int y) {
 rectMode(CENTER);
 stroke(0);
 // trunk
 fill(144,63,0);
 rect(x,y-20,15,40);
 // tree top
 fill(21,95,16);
 triangle(x-30,y-40,
 x,y-160,
 x+30,y-40);
}
```
- What is being drawn?  
→ a tree
  - What differs from one copy to the next?  
→ position (both x and y)
  - How is it drawn?  
→ dark green triangle, brown rectangle  
→ let "position" be the center of the bottom of the trunk (red dot)



## Syntax Example

- function call

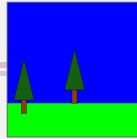
```
void setup () {
 size(400,400);
}

void draw () {
 background(0,0,255);

 // grass
 rectMode(CORNER);
 fill(0,255,0);
 stroke(0,255,0);
 rect(0,height-100,width,100);

 // trees
 drawTree(width/2,height-100);
 drawTree(50,height-70);
}
```

- What are the specific values for the "what differs" things?
  - tree on the left:  $x = 50$ ,  $y = \text{height} - 70$
  - tree in the middle:  $x = \text{width}/2$ ,  $y = \text{height} - 100$



## Syntax Example

- function definition

```
// draw a tree
// (x,y) is the center of the bottom of the trunk
void drawTree (int x, int y) {
 rectMode(CENTER);
 stroke(0);
 // trunk
 fill(144,63,0);
 rect(x,y-20,15,40);
 // tree top
 fill(21,95,16);
 triangle(x-30,y-40,
 x,y-160,
 x+30,y-40);
}
```

What is being drawn?  
→ a tree

What differs from one copy to the next?  
→ position (both x and y)

How is it drawn?  
→ dark green triangle, brown rectangle  
→ let "position" be the center of the bottom of the trunk (red dot)

position (red dot) = (x,y)  
 tree center = (20,20)  
 height = 100 (y-160, 0+30,y-40)  
 (x,y-20), (x+30,y-40)

## Syntax Example

- function call

```
void setup () {
 size(400,400);
}

void draw () {
 background(0,0,255);

 // grass
 rectMode(CORNER);
 fill(0,255,0);
 stroke(0,255,0);
 rect(0,height-100,width,100);

 // trees
 drawTree(width/2,height-100);
 drawTree(50,height-70);
}
```

What are the specific values for the "what differs" things?

- tree on the left:  $x = 50$ ,  $y = \text{height} - 70$
- tree in the middle:  $x = \text{width}/2$ ,  $y = \text{height} - 100$